

E07 FF Planner

16110917 Zhaoshuai Liu

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Contents

1	Examples	2
1.1	Spare Tire	2
1.2	Briefcase World	3
2	Tasks	3
2.1	8-puzzle	3
2.2	Blocks World	4
3	Codes and Results	6

1 Examples

1.1 Spare Tire

domain_spare_tire.pddl

```
1 (define (domain spare_tire)
2   (:requirements :strips :equality :typing)
3   (:types physob location)
4   (:predicates (Tire ?x – physob)
5                 (at ?x – physob ?y – location))
6
7   (:action Remove
8     :parameters (?x – physob ?y – location)
9     :precondition (At ?x ?y)
10    :effect (and (not (At ?x ?y)) (At ?x Ground)))
11
12   (:action PutOn
13     :parameters (?x – physob)
14     :precondition (and (Tire ?x) (At ?x Ground)
15                       (not (At Flat Axle)))
16     :effect (and (not (At ?x Ground)) (At ?x Axle)))
17   (:action LeaveOvernight
18     :effect (and (not (At Spare Ground)) (not (At Spare Axle))
19                 (not (At Spare Trunk)) (not (At Flat Ground))
20                 (not (At Flat Axle)) (not (At Flat Trunk)) ))
21 )
```

spare_tire.pddl

```
1 (define (problem prob)
2   (:domain spare_tire)
3   (:objects Flat Spare –physob Axle Trunk Ground – location)
4   (:init (Tire Flat)(Tire Spare)(At Flat Axle)(At Spare Trunk))
5   (:goal (At Spare Axle))
6 )
```

```

ai2017@osboxes:~/Desktop/spare_tire$ ff -o domain_spare_tire.pddl -f spare_tire.pddl

ff: parsing domain file
domain 'SPARE_TIRE' defined
... done.
ff: parsing problem file
problem 'PROB' defined
... done.

Cueing down from goal distance:    3 into depth [1]
                                   2           [1]
                                   1           [1]
                                   0
ff: found legal plan as follows

step    0: REMOVE FLAT AXLE
        1: REMOVE SPARE TRUNK
        2: PUTON SPARE

time spent:    0.00 seconds instantiating 9 easy, 0 hard action templates
               0.00 seconds reachability analysis, yielding 11 facts and 8 actions
               0.00 seconds creating final representation with 10 relevant facts
               0.00 seconds building connectivity graph
               0.00 seconds searching, evaluating 4 states, to a max depth of 1
               0.00 seconds total time

```

1.2 Briefcase World

Please refer to pddl.pdf at page 2. Please pay More attention to the usages of forall and when.

For more examples, please refer to ff-domains.tgz and benchmarksV1.1.zip. For more usages of FF planner, please refer to the documentation pddl.pdf.

2 Tasks

2.1 8-puzzle

1	2	3
7	8	
6	4	5

Please complete domain_puzzle.pddl and puzzle.pddl to solve the 8-puzzle problem.

domain_puzzle.pddl

```
1 (define (domain puzzle)
2   (:requirements :strips :equality :typing)
3   (:types num loc)
4   (:predicates ()))
5
6 (:action slide
7   :parameters ()
8   :precondition ()
9   :effect ())
10 )
11 )
```

domain_puzzle.pddl

```
1 (define (problem prob)
2   (:domain puzzle)
3   (:objects )
4   (:init )
5   (:goal ()))
6 )
```

2.2 Blocks World

现有积木若干，积木可以放在桌子上，也可以放在另一块积木上面。有两种操作：

- ❶ $move(x, y)$ ：把积木 x 放到积木 y 上面。前提是积木 x 和 y 上面都没有其他积木。
- ❷ $moveToTable(x)$ ：把积木 x 放到桌子上，前提是积木 x 上面无其他积木，且积木 x 不在桌子上。

需考虑 x 在某块积木上面还是在桌子上

x 下方的积木的on要改变

Please complete the file `domain_blocks.pddl` to solve the blocks world problem. You should know the usages of `forall` and `when`.

domain_blocks.pddl

```

1 (define (domain blocks)
2   (:requirements :strips :typing:equality
3                 :universal-preconditions
4                 :conditional-effects)
5   (:types physob)
6   (:predicates
7     (ontable ?x - physob)
8     (clear ?x - physob)
9     (on ?x ?y - physob))
10
11   (:action move
12     :parameters (?x ?y - physob)
13     :precondition ()
14     :effect ()
15     )
16
17   (:action moveToTable
18     :parameters (?x - physob)
19     :precondition ()
20     :effect ( )
21   )

```

blocks.pddl

```

1 (define (problem prob)
2   (:domain blocks)
3   (:objects A B C D E F - physob)
4   (:init (clear A)(on A B)(on B C)(ontable C) (ontable D)
5     (ontable F)(on E D)(clear E)(clear F)
6   )
7   (:goal (and (clear F) (on F A) (on A C) (ontable C)(clear E) (on E B)
8     (on B D) (ontable D)) )
9   )

```

Please submit a file named E07_YourNumber.pdf, and send it to ai_2018@foxmail.com

3 Codes and Results